

KUDRYATSEV, G.A.

Recent developments in the diagnosis of brucellosis in farm animals. Uzb.biol.zhur. no.6:21-24 ' 58. (MIRA 12:1)

1. Chlen-korrespondent AN UzSSR.  
(Brucellosis in cattle--Diagnosis)  
(Opsonins and opsonic index)

KUDRYAVTSEV, G.A.; ARIFDZHANOV, K.A.

Producing formolvaccine against colibacillosis in sheep (lambs).  
Uzb. biol. zhur. no.3:70-73 '59. (MIRA 12:11)

1. Uzbekskiy nauchno-issledovatel'skiy veterinarnyy in sheep (lambs).  
(Escherichia coli) (Vaccines) (Sheep--Diseases and pests)

KUDRYAVTSEV, G.A., prof.; GORTSEVSKIY, S.A., dotsent; KOLOSOVSKIY, V.L.,  
kand veterin. nauk

Symptoms of rabies in calves. Veterinariia 39 no.5:61-62  
My '62 (MIRA 18:1)

1. Belotserkovskiy sel'skokhozyaystvennyy institut.

LYASHENKO, A.T., aspirant; KUDRYAVTSEV, G.A., prof. nauchnyy rukovoditel'

Effect of feed biomycin on the immunogenesis in swine vaccinated  
against erysipelas. Veterinariia 42 no.7:21-22 J1 '65. (MIRA 18:9)

1. Belotserkovskiy sel'skokhozyaystvennyy institut.

KUDRYAVTSEV, G.A.

Border area between the Western Sayans and Tuva. Biul. MOIP. Otd.  
geol. 24 no.6:3-12 '49. (MIRA 11:6)

(Sayan Mountains--Geology)  
(Tuva Autonomous Province--Geology)

KUDRYAVTSEV, G. A.

"The Lower Silurian Formation in Western Sayan," Dok. AN, 67, No. 4, 1949

BELOSTOTSKIY, I.I.; ZONENSHAYN, L.P.; KRASIL'NIKOV, B.N.; KUDRYAVTSEV, G.A.  
MOSSAKOVSKIY, A.A.; POZHARISKIY, I.F.; KHERASKOV, N.N.

Division of the Altai-Sayan mountainous area into tectonic districts.  
Bul.MOIP.Otd.geol. 34 no.4:150-152 JI-Ag '59. (MIRA 13:8)  
(Altai Mountains--Geology, Structural)  
(Sayan Mountains--Geology, Structural)

BELOSTOTSKIY, I.I.; ZONENSHAYN, L.P.; KRASIL'NIKOV, B.N.; KUDRYAVTSEV, G.A.  
MOSSAKOVSKIY, A.A.; POZHARISKIY, I.F.; KHERASKOV, N.N.

Formation and tectonic regions of the Altai-Sayan folded region.  
Bul. MOIP. Otd. geol. 34 no.6:3-22 N-D '59. (MIRA 14:3)  
(Altai Mountains--Folds (Geology))  
(Sayan Mountains--Folds (Geology))



IL'IN, A.V.; KUDRYAVTSEV, G.A.

Pre-Cambrian in Tuva. Sov. geol. 3 no. 9:130-133 S '60.  
(MIRA 13:11)

1. Vsesoyuznyy aerogeologicheskii treat.  
(Tuva Autonomous Province--Geology)

ZONENSHAYN, L.P.; KUDRYAVTSEV, G.A.; MOSSAKOVSKIY, A.A.

Analysis of Paleozoic geological formations in the eastern Altai-Sayan area and their tectonic features. Geol. i geofiz. no. 12:13-23 '60.  
(MIRA 14:5)

1. Vsesoyuznyy aerogeologicheskiy trest, Moskva.  
(Altai Mountains—Geology)  
(Sayan Mountains—Geology)

KUDRYAVTSEV, G.A.; AGENTOV, V.B.

Pyrite-complex metal mineralization in eastern Tuva. Trudy  
SNIGGIMS no.6:80-92 '61. (MIRA 15:7)  
(Tuva A.S.S.R.--Pyrites)

BLAGONRAVOV, V.A.; KUDRYAVTSEV, G.A.

"Absolute age of some igneous and metamorphic rocks in the central part of the Altai-Sayan area" by T.N.Ivanova and others. Reviewed by V.A.Blagonravov, G.A.Kudriavtsev. Sov.geol. 6 no.4:159-160 Ap '63. (MIRA 16:4)

(Altai Mountains—Geology, Stratigraphic)

(Ivanova, T.N.)

AGENTOV, V.B.; KUDRYAVTSEV, G.A.

Genetic relation of the pyrite-complex metal mineralization of  
eastern Tuva to the Lower Cambrian spilite-keratophyre formation.  
Trudy SNIIGGIMS no.35:124-133 '64. (MIRA 18:5)

KUDRYAVTSEV, G.A.

Basic characteristics of the tectonics of Tuva. Biul. MOIP. Otd.  
geol. 40 no.2:22-45 Mr-Apr '65. (MIRA 18:5)

TITLE AND SUBJECT		PROCESSES AND PROPERTIES INDEX		2													
<p><b>KUDRYAVTSEV, G. I.</b></p> <p>The kinetic equations of the Cannizzaro reaction. K. A. Shilov and G. I. Kudryavtsev, <i>Doklady Akad. Nauk S.S.S.R.</i> 68, 681-4 (1948).—Dissmutation of <math>\text{OHCC}_6\text{H}_4\text{SO}_3\text{Na}</math> (I) is of the 4th order, i.e. 2nd-order with respect to I and 2nd-order with respect to alkali. In aq. soln., at initial concn. 0.1-0.4 M, the 4th-order rate const., reduced to the ionic concn. 0.3 M, at 40, 50, and 60°, is <math>k_4 = 0.40, 0.89</math>, and <math>1.43</math> (moles/l., min.); in 8% alc., at 50°, <math>k_4 = 0.41</math>. There is a distinct pos. salt effect. Cannizzaro dissmutation of 2-pyridinecarboxaldehyde (II) follows the 2nd order (1st-order with respect to II and 1st-order with respect to alkali); at 40°, in <math>\text{H}_2\text{O}</math>, <math>k_2 = 0.0310</math>, at 50°, in 48% alc., <math>k_2 = 0.0175</math>; no salt effect. The causes of the differences in the order of the reaction rate are unknown.</p> <p style="text-align: right;">N. Thon</p>																	
Inst. Org. Chem. Ukr. AS USSR																	
ASB-ILA METALLURGICAL LITERATURE CLASSIFICATION																	
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PA 26/49T8

KUDRYAVTSEV, G. I.

USSR/Chemistry - Cannizzaro Reaction  
Chemistry - Catalysis

Jan 49

"Catalytic Effects in the Cannizzaro Reaction,"  
G. I. Kudryavtsev, Ye. A. Shilov, Inst Org Chem,  
4 pp

"Dok Ak Nauk SSSR" Vol LXIV, No 1

Tabular and graphical data show catalytic effects  
of peroxide and various solutions of metals (Cu,  
Ni, Ag, Co, etc.) on subject reaction. Submitted  
16 Oct 48.

26/49T8



ANDRYAVTSEV, G.I.

Increasing the affinity of polyacrylonitrile fibers for acid-  
and vat dyes. M. A. Zharkova and G. I. Andryavtsev  
U.S.S.R. 103,914, Sept. 25, 1964  
nitride fibers, and when  
they are treated with an alkali  
chloride or hydrosulfate of

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**CIA-RDP86-00513R000827210013-7"**

RYAVTSEV, G. I.

2007

Modification of fiber forming synthetic high polymers

**THE UNIVERSITY OF CHICAGO**

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KUDRYAVTSEV, G. Y., STOLPINIYEV, A. A., and VASIL'YEVA, SOKHOLOVA, E. A.

"After treatment and modifications of polyacrylonitrile," a paper presented at the 9th Congress on the Chemistry and Physics of High Polymers, 28 Jan-2 Feb 57, Moscow, Fiber Research Inst.

B-3,084,395

*KUDRYAVTSHEV*  
KUDRYAVTSHEV, G.I.

New methods of modification of the properties of fiber forming  
synthetic high molecular compounds. Usp. khim. i tekhn. polim. no.2:  
81-96 '57. (MIRA 11:1)  
(Macromolecular compounds)

KUDRYAVTSEV, G.I.; ZHARKOVA, M.A.

Acid hydrolysis of copolymers based on acrylonitrile. Zhur.prikl.  
khim. 29 no.7:1103-1108 J1 '57. (MIRA 10:10)  
(Hydrolysis) (Acrylonitrile) (Polymers)

AUTHORS: Kudryatsev, G. I., Sheyn, T. I., 64-58-3-8/20  
Batik'yan, B. A.

TITLE: The New Polyamide Type Fiber "Kapronant" (Novoye volokno poliamidnogo tipa "kapronant")

PERIODICAL: Khimicheskaya Promyshlennost', 1958, Nr 3, pp 29-32 (USSR)

ABSTRACT: The collectives of the Institute for Element-Organic Compounds of the Academy of Sciences, USSR, of the GIAP, and of the Moscow Electrolysis Works developed an industrial method of synthesizing amino-enanthic acid and other higher amidocarboxylic acids, thus causing an increase of the raw material basis for the production of polyamide fibers. The present paper describes investigations of copolymers on the basis of amino-enanthic acid and capro-lactam in different properties of weight; the experimental investigations were made in co-operation with L.N. Vlasova. The investigations were made in open ampoules, in nitrogen atmosphere at 2600 and in 6 hours. The specific weight of the copolymers thus obtained varied from 0.75 to 0.78. Graphical representations of the change in the content of compounds of low molecular weight, of the fusing temperature and

Card 1/2



The New Polyamide Type Fiber "Kapronant"

64-58-3-8/20

of the solubility are given as a function of the component ratio. The results given here show among other facts that the fusing point curve with a 50:50 aminocanthic acid - capro-lactam ration has a minimum at  $142^{\circ}$ , and that in this range copolymers can be obtained which can be used for adhesives, varnishes and so on. The copolymers which are interesting for the production of fibers are referred to as "kapronant" and has a higher fusing point and a greater stability in boiling water. The obtained data of their properties are given in tabular form. As the fibers agglutinated when spun they were greased with the anhydrous preparations BV, T-1. The obtained fiber is similar to other polyamide fibers as to its properties but shows a greater resistance against multiple deformation and is soft. There are 3 figures, 2 tables, and 5 references, 2 of which are Soviet.

1. Amidocarbonic acids--Synthesis
2. Polymers--Analysis
3. Synthetic fibers--Production
4. Synthetic fibers--Properties

Card 2/2

KUDRYAVTSKY, G.I.; SHEYN, T.I.; BATIK'YAN, B.A.

New polyamide fiber "kapronant." Khim. prom. no.3:157-160 Ap-My  
'58. (MIRA 11:6)  
(Amide) (Textile fibers, Synthetic)

KUDRYAVTSEV, G.I.; BERNATSKAYA, Ye.E.; SHEVELKIN, L.F.

High-speed forming of polyamide fibers. Tekst. prom. 18 no.2:15-16  
(MIRA 13:3)

F '58. (Textile fibers, Synthetic) (Polyamides)

SOLOLOVA-VASIL'YEVA, Ye.A.; KUDRYAVTSEV, G.I.; STREPIKHEYEV, A.A.

Saponification process of polyacrylonitrile by sulfuric acid.  
Zhur. prikl. khim. v. 31 no.5:785-790 My '58. (MIRA 11:6)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo  
volokna.

(Saponification) (Nitro compounds) (Sulfuric acid)

KUDRYAVTSEV, G.I.; RASSOLOVA, E.A.

Analogous intramolecular conversions of synthetic fiber-forming polymers. Khim.volok. no.1:36-40 '59. (MIRA 12:8)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna.

(Polymers) (Textile fibers, Synthetic)

VOLOKHINA, A.V.; KUDRYAVTSEV, G.I.

Polycondensation reactions in the solid phase. Part 2: Solid phase polycondensation of  $\epsilon$ -aminoanthic acid in the presence of catalysts. Vysokom.soed. 1 no.11:1724-1732 N '59.  
(MIRA 13:5)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna.

(Heptanoic acid)

(Condensation products)

BOGDANOV, M.N.; KUDRYAVTSEV, G.I.

Ways of synthesizing new fiber-forming polymers. Khim.volok.  
no.3:3-10 '59. (MIRA 12:11)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo  
volokna (VNIIV).  
(Textile fibers, Synthetic) (Polymerization)

KUDRYAVTSEV, G.I.; KATORZHNOV, N.D.; KRUTIKOVA, A.D.

Fraction composition of polyamides obtained by the polycondensation method. Khim.volok. no.3:16-18 '59.  
(MIRA 12:11)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna (VNIIV).  
(Amides)



5(3) 307/61.4.3-19/1

**AUTHORS:** Bogdanovskiy, Ye.M., Candidate of Technical Sciences, Engineer, 3.0.

**REVIEWS:** Scientific-Technical Conference and a Seminar on the Production and Processing of Chemical Fibers

**REMARKS:** Kharkovskaya tekhn. i promyshlennost', 1959, Vol. 4, No. 3, pp. 398-402, (2581)

[illegible]

KUDRYAVTSEV, G.I.; KATORZHNOV, N.D.; KRUTIKOVA, A.D.

Studying the process of polymerization of caprolactam by the  
fractionation of polymers. Report No.4 Khim.volok. no.4:  
10-12 '59. (MIRA 13:2)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo  
volokna.

(Hexamethylenimine) (Polymerization)

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15.5540

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SOV/183-59-5-3/28

5(3)  
AUTHORS:

Volokhina, A. V., Kudryavtsev, G. I.

TITLE:

Polycondensation Reactions in the Solid Phase. Communication 1.  
Polycondensation of Aliphatic  $\omega$ -Amino Acids and Diamine Salts  
of Dicarboxylic Acids in the Solid Phase

PERIODICAL:

Khimicheskiye volokna, 1959, Nr 5, pp 13-18 (USSR)

ABSTRACT:

The authors investigated the general rules of polycondensation in the solid phase by means of three  $\omega$ -amino acids (amino-enanthic acid, aminopelargonic acid, aminoundecanic acid) and the hexamethylene-diamine salts of the adipic, terephthalic, and thioldivalerianic acids. The temperature dependence of the reaction was observed by continuous weighing during the condensation process, and by measuring the quantity of water separated out. It was shown that the reaction takes place within rather small temperature ranges (6-15°C) near the melting point of the initial and end products, the temperature coefficient of the reaction rate being rather high. If the three amino acids are compared with respect to the reaction rate of polycondensation at the same temperature, the aminoundecanic acid reacts most rapidly followed by the aminoenanthic acid, the aminopelargonic acid

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SOV/183-59-5-3/28

Polycondensation Reactions in the Solid Phase. Communication 1. Polycondensation of Aliphatic  $\omega$ -Amino Acids and Diamine Salts of Dicarboxylic Acids in the Solid Phase

being the slowest. With respect to the activation energy, the acids show the same order beginning with the aminoundecanic acid as the consumer of the least energy. As to the polycondensation of the hexamethylene-diamine salts of dicarboxylic acids, it was shown that the higher the melting point of the salt is, the higher will also be the temperature at which the reaction starts, and the wider the temperature range is within which the reaction takes place, the lower will be the temperature coefficient of the reaction rate. If the reaction takes place in the solid phase in open vessels at higher temperatures, hexamethylene diamine will be separated out and, thus, excluded from the reaction. In this way, the reaction equilibrium is shifted to the effect that a formation of higher-molecular polyamides is not possible. The same applies to the reaction in the liquid phase (melt). There are 5 figures, 4 tables, and 10 references, 3 of which are Soviet.

ASSOCIATION: VNIIV  
Card 2/2

SIGAL, M.B.; KUDRYAVTSEV, G.I.; KOZIOROVA. T.N.

Method and equipment for determining the fiber-forming properties  
of high-melting polymers. Khim.volok. no.5:29-30 '59.  
(MIRA 13:4)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo  
volokna (VNIIV).  
(Polymers) (Textile fibers, Synthetic)

5 (3)

AUTHORS:

Bogdanov, M. N., Kudryavtsev, G. I.

SOV/79-29-3-50/61

TITLE:

Synthesis and Polycondensation of the n-Amino-Methyl-Phenyl-Alkane-Carboxylic Acids (Sintez i polikondensatsiya n-amino-metilfenilalkankarbonovykh kislot)

PERIODICAL:

Zhurnal obshchey khimii, 1959, Vol 29, Nr 3, pp 986-989 (USSR)

ABSTRACT:

The compounds which are most suitable for the synthesis of the high-melting synthetic fibers are the polyamides of the homopolycondensation type of unbranched  $\alpha,\omega$ -amino acids which have n-phenyl groups in their methylene chains in contrast to the less thermostable heteropolycondensation polyamides. In the present paper the following acids were synthesized: n-amino-methyl-phenyl-acetic-(I), n-amino-methyl-phenyl-propionic-(II), n-amino-methyl-phenyl-butyric-(III), and n-amino-methyl-phenyl-valeric acid (IV)  $[NH_2CH_2C_6H_4(CH_2)_nCOOH(n=1-4)]$ . The corresponding n-chloromethyl-phenyl-alkane-carboxylic acids (Ref 3) served as initial products. Since it is not possible to aminate the chloromethyl group of these compounds immediately with ammonia, this amination was carried out by the decomposition of the complexes of Urotropin with

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Synthesis and Polycondensation of the n-Amino-  
Methyl-Phenyl-Alkane-Carboxylic Acids

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the n-halogen-methyl-phenyl-alkane-carboxylic acids. The synthesis of the Urotropin complexes was not carried out according to reference 4 (i.e. it proceeded from the above mentioned acids in which iodine substituted Cl), but the above mentioned substituted compounds were used directly and quantitative yields and cleavage products without iodine admixtures were obtained. The chlorine hydrates of the amino acids obtained by the cleavage of the Urotropin complexes were converted into free amino acids by the evaporation of their ammonia solution. The dry residue consisted in a mixture of ammonium chloride and free amino acid which was liberated from its mineral ingredient by the recrystallization from water. The synthesized amino acids have no distinctly marked melting point and are not easily soluble in water. In the case of heating they are transformed into high-molecular polyamides. These polyamides are produced not only in the case of a melted state of the initial products, but already at temperatures below their melting point, i.e. in dry state which is very important for the production of the thermolabile polymers. The polyamides from (III) and (IV) are stable, horny compounds

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Synthesis and Polycondensation of the n-Amino-  
Methyl-Phenyl-Alkane-Carboxylic Acids

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which yield in the case of further treatment stable fibers which are easily extensible in cold state. The polyamides (I) and (II) decompose on melting and can therefore not be used for the above mentioned purpose. There are 1 table and 4 references, 1 of which is Soviet.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna (All-Union Scientific Research Institute of Synthetic Fibers)

SUBMITTED: January 28, 1958

Card 3/3



5 (3)

AUTHORS:

Volokhina, A. V., Kudryavtsev, G. I.

SOY/20-127-6-21/51

TITLE:

Polycondensation of the  $\omega$ -Aminocaproic,  $\omega$ -Aminopelargonic, and  $\omega$ -Aminoundecanoic Acids in the Solid Phase

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 6, pp 1221-1224 (USSR)

ABSTRACT:

The polycondensation of some bifunctional compounds can be carried out, according to data in publications (Refs 1-5), in a solid state. This reaction has, however, not yet been investigated systematically. It is, however, of high theoretical and practical importance, particularly if the monomers, and the polymers obtained from them, are insufficiently heat-resistant. Besides, the said polycondensation apparently represents a basic method of producing polymers which are not fusible, or fusible at high temperature under decomposition; e.g. polyamides containing aromatic or hydroaromatic rings (Ref 6) in the chains of the macromolecules. The amino acids mentioned in the title were made of tetrachloroalkanes (products of telomerization of ethylene with  $\text{CCl}_4$ , Ref 8). Figure 1 shows the curves of the polycondensation process. From the values of the polymerization degrees of the polyamides determined from the

Card 1/3

Polycondensation of the  $\omega$ -Aminocaproic,  
 $\omega$ -Aminopelargonic, and  $\omega$ -Aminoundecanoic Acids in the Solid Phase

SOV/20-127-6-21/51

number of terminal groups, as well as from the polymer yields, the water quantity can be computed which was separated from a certain quantity of amino acid. A comparison of these quantities with directly measured (weighed) quantities is shown in table 1. The results obtained demonstrate that: 1) the polycondensation mentioned in the title proceeds at a considerable rate within a rather narrow temperature range (6-15°); these temperatures lie near the melting points of the said amino acids (by 5-20° deeper) and of the polyamides corresponding to these acids (by 8-50° deeper). 2) The rate of this reaction has a very high temperature coefficient. 3) The duration of polycondensation in the solid phase at 184° must be 18 h at least if polyamides are to be obtained from the aminocaproic acid with a specific viscosity required for the formation of solid fibers. 4) It is not possible to compare the polycondensation rates of the 3 mentioned amino acids at the same temperature since the temperature ranges of the polycondensation of the 2nd and 3rd acids are different. If the usual kinetic method is applied to describe the reactions in the solid phase, the data indicated in

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Polycondensation of the  $\omega$ -Aminoenoanthic,  
 $\omega$ -Aminopelargonic, and  $\omega$ -Aminoundecanic Acids in the Solid Phase

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table 2 and figure 2 are obtained in the computation of the effective activation energies of polycondensation. According to the values of the activation energy, the acids under consideration can be placed into a series: aminoundecanic acid < aminoenoanthic acid < aminopelargonic acid. This series has no relation to the chemical structure of these acids. As is expected, the activation energy falls rapidly in the presence of a liquid phase. There are 2 figures, 2 tables, and 9 references, 2 of which are Soviet.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna (All-Union Scientific Research Institute of Synthetic Fibers)

PRESENTED: April 15, 1959, by V. A. Kargin, Academician

SUBMITTED: April 8, 1959

Card 3/3

15.5540  
5.3832

5(3)

AUTHORS:

Petrov, A. D., Corresponding Member, AS USSR, Freydlin,  
L. Kh., Kudryavtsev, G. I., Sladkova, T. A., Vdovin, V. M.,  
Sheyn, T. I.

67915

SOV/20-129-5-28/64

TITLE:

Catalytic Hydrogenation of Silicon-containing  $\gamma$ -nitriles  
and the Fiber-forming Properties of Polyamides Obtained  
From the Amines Produced Thereby

7

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 5,  
pp 1064 - 1067 (USSR)

ABSTRACT:

The hydrogenation mentioned in the title has been hitherto  
little investigated (Refs 1,2). By the investigation under  
review, the authors succeeded in producing amides hitherto  
not described in publications. Polyamides (with a siloxane  
group) obtained on the basis of dicarboxylic acids of the  
aliphatic series are known to exhibit caoutchouc-like pro-  
perties in a number of cases (Ref 3). The condensation of  
aromatic dicarboxylic acids (with a siloxane group) with  
hexamethylene diamine yields fiber-forming polyamides<sup>4</sup> (Ref 1).  
In both cases the siloxane group in the dicarboxylic acids  
effects the melting temperature of the polyamides obtained

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Catalytic Hydrogenation of Silicon-containing

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SOV/20-129-5-28/64

$\gamma$ - nitriles and the Fiber-forming Properties of Polyamides Obtained From  
the Amines Produced Thereby

therefrom to be reduced. The authors intended to investigate the properties of polyamides produced by using the silicon-containing diamines prepared by themselves. As was to be expected from data contained in publications, the fiber-forming polyamides can be produced solely by condensation of the said diamines with aromatic acids. The authors therefore used diamine salts and terephthalic acid for their experiments. The silicon-containing  $\gamma$ -dinitriles:

$[\text{NC}(\text{CH}_2)_3\text{-Si}(\text{CH}_3)_2]_2\text{O}$ ,  $[\text{NC}(\text{CH}_2)_3\text{-Si}(\text{CH}_3)(\text{C}_2\text{H}_5)]_2\text{O}$  and  $[\text{NC}(\text{CH}_2)_3\text{-Si}(\text{C}_2\text{H}_5)_2]_2\text{O}$  were obtained by hydrolysis of the

$\gamma$ - cyano-propyl-dialkyl-chlorosilanes (Ref 4).

$\text{NC}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{CH}_2\text{-Si}(\text{CH}_3)_2\text{CH}_3$  was obtained from a mixture of

$\text{NC}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{CH}_2\text{Si}(\text{CH}_3)\text{Cl}$  (120 g) and anhydrous pyridine

(104 g) in anhydrous ether (800 ml) on cooling with ice water and on adding 40 g of absolute methanol during 1 h of vigorous stirring. This substance has not yet been

described in publications. The nitriles were hydrogenated in

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Catalytic Hydrogenation of Silicon-containing  
 $\delta$ - nitriles and the Fiber-forming Properties of Polyamides Obtained From  
the Amines Produced Thereby

67918

SOV/20-129-5-28/64

a rotating steel autoclave with nickel skeleton catalyst and ammonia. The amine fraction was readily distilled by fractionating the catalyzate. Its degree of purity was 97-100% (Table 1). Table 1 also specifies the experimental conditions and yields. Table 2 supplies the constants of amines and their derivatives. In this manner the following symmetrical di( $\delta$ -amino-butyl)-tetra-alkyl disiloxanes were produced: I) (see Scheme) along with its salt with terephthalic acid ( $C_{12}H_{32}Si_2N_2O.C_8H_6O_2$ ); II) (see Scheme) together with its salt with terephthalic acid ( $C_{14}H_{36}Si_2N_2OC_8H_6O_2$ ); III) (see Scheme) together with its salt with terephthalic acid ( $C_{16}H_{40}Si_2N_2OC_8H_6O_2$ ). The yield drops with the prolongation of the lateral alkyl groups and is in I - 92%, II - 87%, III - 70%. Table 2 shows the constants of the amines and their salts with terephthalic acid. The yield of the salts was 80-85%. All amines obtained are colorless clear liquids, non-soluble in water (they form an emulsion), soluble in 50% alcohol. The polyamides were obtained by

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Catalytic Hydrogenation of Silicon-containing

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- nitriles and the Fiber-forming Properties of Polyamides Obtained From the Amines Produced Thereby

heating (polycondensation) of the produced salts in nitrogen atmosphere. They are pale-yellow, horny, elastic, transparent resins of amorphous structure, well soluble in cresol and concentrated  $H_2SO_4$ . They swell in hydrochloric and formic acid, but do not solve. Table 3 shows the conditions of polycondensation. All these polyamides, when melted, yield fibers, which are dilatible by 300-400% at low temperature. The stability of the fibers is not very high. The results obtained confirmed that the substitution of methyl radicals on the silicon atom by ethyl radicals causes the polyamide melting temperature to drop. The siloxane group in the principal chain increases the flexibility and elasticity (like the oxygen atoms). There are 2 tables and 6 references, 2 of which are Soviet. 4

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR). Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna (All-Union Scientific Research Institute of Synthetic Fibers)

Card 4/5

Catalytic Hydrogenation of Silicon-containing

8- nitriles and the Fiber-forming Properties of Polyamides Obtained From  
the Amines Produced Thereby

67918

SOV/20-129-5-28/64

SUBMITTED: August 3, 1959

Card 5/5



KUDRYAVTSEV, G.I.

SOV/4984

PHASE I BOOK EXPLOITATION

International symposium on macromolecular chemistry. Moscow, 1960.

Mezhdunarodnyy simpozium po makromolekulyarnoy khimii SSSR, Moskva, 14-18 iyunya 1960 g.; doklady i avtoreferaty. Sektsiya III. (International Symposium on Macromolecular Chemistry Held in Moscow, June 14-18, 1960; Papers and Summaries) Section III. [Moscow, Izd-vo AN SSSR, 1960] 469 p. 55,000 copies printed.

Tech. Ed.: P. S. Kashina.

Sponsoring Agency: The International Union of Pure and Applied Chemistry. Commission on Macromolecular Chemistry.

PURPOSE: This book is intended for chemists interested in polymerization reactions and the synthesis of high molecular compounds.

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International Symposium (Cont.)

SOV/4984

COVERAGE: This is Section III of a multivolume work containing papers on macromolecular chemistry. The articles in general deal with the kinetics of polymerization reactions, the synthesis of special-purpose polymers, e.g., ion exchange resins, semiconductor materials, etc., methods of catalyzing polymerization reactions, properties and chemical interactions of high molecular materials, and the effects of various factors on polymerization and the degradation of high molecular compounds. No personalities are mentioned. References given follow the articles.

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Smets, G., and W. De Loecker (Belgium). Reaction Kinetics and Tacticity of Macromolecules	5
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UDRYAVTSEY, G.I.

International Symposium on Macromolecular Chemistry, Moscow, 1966.  
 1966 81 Gollady I. artemovskiy. Saksyia II. (International Symposium on Macromolecular Chemistry held in Moscow, June 14-15, 1966). Papers and Summaries Section II. [Moscow, Ind-ro Ak SSSR, 1966] 599 p. 5,500 copies printed.  
 Sponsoring Agency: The International Union of Pure and Applied Chemistry, Commission on Macromolecular Chemistry  
 Tech. Ed.: T.A. Prudkova.

PURPOSE: This book is intended for chemists interested in polymerization reactions and the synthesis of high-molecular compounds.

COVERAGE: This is Section II of a multivolume work containing papers on macromolecular chemistry. The papers in this volume treat mainly the kinetics of various polymerization reactions initiated by different catalysts or induced by radiation. Among the research techniques discussed are infrared, resonance spectroscopy and light-scattering interpolation. There are summaries in English, French and Russian. No personalities are mentioned. References follow each article.

Barin, I.A., and I.A. Patai (USSR). Processes of Polymerization and Grafting on Freely Formed Surfaces

Volokhin, A.V., G.I. Polozovskiy, S.M. Shustov, and A.I. Bontskaya

Gollady, I., A. Saksyia, Z. Holly, and Z. Spiller (Summary). Mechanism of the Polymerization of  $\epsilon$ -Caprolactam in the Presence of Phosphoric Acid

Chernomordin, G., B. Gerasimov, and Vlodavskiy (Poland). Mechanism of  $\epsilon$ -Caprolactam, Benzotriazole and Copolymerization in the Presence of Salts in Nonpolar Solvents With Carbon Dioxide as an Activator

Vassio-Smeredov, I.K. Kurov-Ovseyev and E. Vody-Bol (Summary). Investigation of Maltose Polymerization During the Polymerization of Different Carbohydrates

Lasoch, Z., and S. Chruszczewski (Poland). Kinetics of the Polymerization of Dimethylsiloxane

Pratochill, P., Mink, and S. Sedláček (Czechoslovakia). Use of the Extrapolation Method in Computing Data on Light-Scattering for the Case of Continuous Constant Observation of Polymerization in Particles

AVAILABLE: Library of Congress

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Bresler, S.Ye., M.I. Kozlovskiy, L. Ya. Polubinsky, and Shih Kung-ai (USSR). Study of Some Details of the Mechanism of Polymerization Under the Action of Complex Catalysts

Tsvetkov, V.R., S.Ye. Mityuk, A.S. Puzosov, and M.J. Gomers (USSR). Stereospecificity and the Optical Properties of Polymers

Birzhov, S.M., Yu. Ya. Gollub, and G.B. Pritom (USSR). The Microviscosity of Polymers and Methods of Study

Abkin, A.B., A.P. Shernkov, M.F. Yakovlev, and L.P. Mikhlin (USSR). On Carbonium and Carbanion Polymerization Mechanisms Under the Effects of Gamma Radiation

Kargin, I.A., and V.A. Kabanov (USSR). Polymerization Processes in Insoluble Molecular Dispersions

Machadik, R., I. Mejlisk, and I.A. (Czechoslovakia). Kinetics of the Polymerization of Formaldehyde

Vesely, E. (Czechoslovakia). On the Mechanism of Ionic Polymerization Compounds in the Cationic Polymerization of Isobutylene

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272 45

S/183/60/000/02/08/025  
B004/B005

AUTHOR: Kudryavtsev, G. I., Deputy Scientific Director

TITLE: Report

PERIODICAL: Khimicheskiye volokna, 1960, No. 2, pp. 19 - 22

TEXT: This report was delivered at the Branch Conference of the Synthetic Fiber Industry in Klin, December 16-18, 1959. The lecturer gives a survey of shortcomings ascertained in the synthetic fiber industry. The causes are: deficient equipment, nonobservance of production regulations, and bad raw materials. The lecturer discusses the resulting consequences. The unsatisfactory equipment for filtration and elimination of air from the viscose, for instance, effects that these processes must take place within 12-14 hours in the Kalininskiy kombinat (Kalinin Kombinat) and the Barnaul'skiy zavod (Barnaul Works). Consumption of cellulose in the Kalinin Kombinat and the Kamenskiy kombinat (Kamenka Kombinat) is 10% higher than in factories abroad. The spinning frames of the type PN-300 should be improved. Most technical improvements can be carried out by the factories without cooperation of the GIPROIV (State Institute for the Design and Planning of Synthetic Fiber Industry Establishments). The Kalinin Kombinat and

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Report

8/183/60/000/02/08/025  
B004/B005

the Leningradskiy zavod (Leningrad Works) were able to increase the fiber breaking length to 19-20 km. For a further increase, modern equipment is necessary which should be procured by the Rostovskiy sovmarkhoz (Rostov sovmarkhoz) and the Leningradskiy sovmarkhoz (Leningrad sovmarkhoz). The VNIIV (All-Union Scientific Research Institute of Synthetic Fibers) developed a viscose staple fiber with a breaking length of 23-25 km; its processing at the fabrika "Oktyabr'skaya Revolyutsiya" ("October Revolution" Factory) yielded satisfactory results. An addition of modifiers gave positive results which were also confirmed by the TsNIIKhBI (Central Scientific Research Institute of the Cotton Industry). The Klinskaya laboratoriya (Klin Laboratory) of the VNIIV ascertained that caprolactam polymerization is stopped much too early in the Klinskiy kombinat (Klin Kombinat). Ventilation systems causing disturbing air eddies in the fiber formation zone were planned there and in the Kiyevskiy kombinat (Kiyev Kombinat). A table shows that the quality of caprolactam is worse than in Eastern Germany and Italy. Standards should be improved. In recent years, the VNIIV has left the working out of many problems to the TsNII (Central Scientific Research Laboratories) of the factories but qualified specialists were missing there. In 1960, the VNIIV will establish an automatized experimental plant. The first Soviet spinning frame of the type PSh-180-I2 for a continuous production of viscose rayon is being

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Report

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B004/B005

tested at present. Dyes and reliable dosing apparatus are missing. The NIOPIK (Scientific Research Institute of Organic Semifinished Materials and Dyes) should relieve this situation. Almost no textile adjuvants and modifiers are being produced in the Soviet Union. This is also a problem to be solved by the institutes of the Gosudarstvennyy Komitet Soveta Ministrov SSSR po khimii (State Committee on Chemistry of the Council of Ministers USSR). The lecturer reports on some experiments of VNIIV in this respect. Above all, there are no experimental plants to check the experimental results. There is 1 table.

ASSOCIATION: VNIIV (Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna - All-Union Scientific Research Institute of Synthetic Fibers)

Card 3/3

S/183/60/000/02/12/025  
B004/B005

AUTHORS: Kudryavtsev, G. I., Katorzhnov, N. D., Kratikova, A. G.  
TITLE: Investigation of the Fractional Composition of Polycaprolactam  
PERIODICAL: Khimicheskiye volokna, 1960, No. 2, pp. 30 - 33

TEXT: This is the 5th information of the series "Investigation of Polymerization of Caprolactam". It was the object of the present paper to check the influence of the end group on the fractional composition of polycaprolactam as predicted by A. A. Strepikheyev (Ref. 2). Caprolactam was polymerized by addition of water as an activator, and acetic acid or cyclohexylaminacetate as a stabilizer. Polymerization took place in nitrogen-filled phials (Table). The results are shown in Figs. 1,2. The fractional composition of the caprolactam polymerizate of a mean polymerization degree (65-150) obtained at equal temperature is independent of the type of the end group (amine-, carboxyl-, acetamide-, or alkylamide group). The fractional composition of the polymers obtained at equal temperature is a function of the polymerization degree. The lower it is, the more homogeneous is the composition. A homogeneous polymerizate cannot be produced by usual methods.

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Investigation of the Fractional Composition of  
Polycaprolactam

S/183/60/000/02/12/025  
B004/B005

The authors mention papers by V. V. Korshak and S. Ye. Bresler (Ref. 6) and  
A. V. Volokhina (Ref. 11). There are 2 figures, 1 table, and 11 references,  
5 of which are Soviet.

ASSOCIATION: VNIIV (All-Union Scientific Research Institute of Synthetic  
Fibers)

Card 2/2



*Kudrya V. I.*

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8004/8061

82080

AUTHORS:

Volokhina, A. V., Bogdanov, M. N., Kudryavtsev, G. I.

TITLE:

Polycondensation Reactions in the Solid Phase. III.  
Polycondensation of p-Aminoalkyl-phenyl Alkano Carboxylic  
Acids in the Solid Phase

PERIODICAL:

Vysokomolekulyarnyye soyedineniya, 1960, Vol. 2, No. 1,  
pp. 92-96

TEXT: The authors previously described the synthesis of carboxylic acids of the general formula  $H_2N(CH_2)_m(C_6H_4)_n(CH_2)_nCOOH$  ( $m = 1, 2, n = 1, 2, 3, 4$ ) and their polycondensation (Refs. 1, 2). The kinetics of the polycondensation of the following  $\alpha, \omega$ -amino acids is examined here: p-aminomethyl-phenyl propionic acid (I); p-aminomethyl-phenyl valeric acid (II); p-aminoethyl-phenyl acetic acid (III); p-aminoethyl-phenyl propionic acid (IV); p-aminoethyl-phenyl butyric acid (V); and p-aminoethyl-phenyl valeric acid (VI). The kinetics of the polycondensation were

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Polycondensation Reactions in the Solid Phase.  
 III. Polycondensation of p-Aminoalkyl-phenyl  
 Amino Carboxylic Acids in the Solid Phase

82080

S/190/60/002/01/11/021  
 B004/B061

observed during the reaction by continuous weighing, and the degree of polymerization was established by determination of the separated water. Fig. 1 shows the kinetics of the polycondensation of the above compounds, and Table 1 gives the experimental data. It follows from this that the initial temperature of polycondensation falls with sinking melting point of the amino acid and with increasing content of methylene groups. As regards p-aminoethyl compounds, the temperature range between the initial temperature of the polycondensation and the melting point of the acid decreases with increasing content of methylene groups and with decreasing melting point of the acid. This connection was not observed in methyl-substituted compounds. With increasing content of methylene groups, the polycondensation reaction rate increases. Fig. 2 shows the change with time of the degree of polymerization of compound (I), which is not linear. Table 2 gives the activation energies for the polycondensation of compounds (I) to (VI). There are 2 figures, 2 tables, and 4 references: 3 Soviet and 1 US.

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Polycondensation Reactions in the Solid Phase:  
III. Polycondensation of p-Aminoalkyl-phenyl  
Alkane Carboxylic Acids in the Solid Phase

S/190/60/002/01/11/021  
B004/B061  
82080

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut  
iskusstvennogo volokna (All Union Scientific Research  
Institute of Synthetic Fibers)

SUBMITTED: October 9, 1959

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Card 3/3

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S/183/60/000/03/06/007  
B020/B054  
82064

AUTHORS: Zharkova, M. A., Kudryavtsev, G. I.

TITLE: Copolymerization of Acrylonitrile and  $\alpha$ -Vinyl Pyridine in  
Aqueous Sodium Thiocyanate Solution

PERIODICAL: Khimicheskiye volokna, 1960, No. 3, pp. 15-18

TEXT: As no publication data are available on the copolymerization of acrylonitrile (AN) with  $\alpha$ -vinyl pyridine ( $\alpha$ -VP) in aqueous sodium thiocyanate solutions, the present paper studies the principal rules governing the process of producing a thread-forming copolymer with low vinyl pyridine content. Table 1 shows the change in composition of the copolymer from the initial ratio of monomers in copolymerization; it was found that, in agreement with theoretical calculations, the copolymer obtained always exhibits an increased  $\alpha$ -VP content. Fig. 1 shows the dependence of the copolymer yield on the initial concentration of monomers in the solution, Fig. 2 the dependence of the initial rate of polymerization on the monomer concentration in the solution, Fig. 3 the dependence of the monomer consumption on time at different concentrations of the initiator

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X

Copolymerization of Acrylonitrile and  $\alpha$ -Vinyl  
Pyridine in Aqueous Sodium Thiocyanate Solution S/183/60/000/03/06/007  
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at a ratio AN :  $\alpha$ -VP = 95 : 5 % by weight, and Fig. 4 the same dependence  
at a ratio AN :  $\alpha$ -VP = 90 : 10 % by weight. The influence of temperature  
on the polymerization rate of AN with  $\alpha$ -VP is indicated in Table 2.  
Table 3 shows the influence of regulators (lauryl mercaptan, thiourea,  
dipropyl xanthogenate disulfite) on copolymerization, and Table 4 the  
influence of the monoethanol amine amount on the copolymer yield. It  
is shown that the reaction rate is proportional to the initial con-  
centration of the monomer mixture and the square root of the initial  
concentration of the initiator. The authors describe the reagents  
used, the methods of investigation, and the determination of copolymer  
composition. E. A. Rassolova cooperated in working out the methods.  
There are 5 figures, 4 tables, and 5 references: 2 Soviet, 2 German,  
3 British, and 2 French.

ASSOCIATION: VNIIV (All-Union Scientific Research Institute of Fibers)

Card 2/2

S/183/60/000/005/002/007  
B005/B054

AUTHORS: Sheyn, T. I., Kudryavtsev, G. I., Vlasova, L. N.  
TITLE: Study of Alkaline Hydrolysis of Adipic and Sebacic Acid Chlorides  
PERIODICAL: Khimicheskiye volokna, 1960, No. 5, pp. 13-15

TEXT: In connection with the new procedure of interfacial polycondensation of organic compounds, which is based on the Schotten - Baumann reaction (Ref. 1), the authors studied the kinetics of alkaline hydrolysis of adipic and sebacic acid chlorides in benzene and chloro benzene as solvents at different temperatures. Alkaline saponification of the two acid chlorides proceeds according to the reaction scheme:  
$$\text{ClOC}(\text{CH}_2)_n\text{COCl} + 4 \text{NaOH} \longrightarrow 2 \text{NaCl} + \text{NaOOC}(\text{CH}_2)_n\text{COONa}.$$
 The degree of hydrolysis was determined from the amount of lye consumed. The authors developed the following method of investigating the hydrolysis of adipic and sebacic acid chlorides: The weighed portion of the acid chloride was dissolved in dry benzene or chloro benzene to a 3% solution (% by weight). 10 ml of this solution was added from a pipette to exactly 40 ml of

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Study of Alkaline Hydrolysis of Adipic and  
Sebacic Acid ChloridesS/183/60/000/005/002/007  
B005/B054

0.445 N potash lye under continuous mixing. The reaction vessel containing the lye had been put 15-20 min before into a thermostat whose temperature could be adjusted with an accuracy of  $\pm 0.05^\circ\text{C}$ . The resulting reaction mixture was continuously mixed in the thermostat at constant velocity during the period of investigation. After this period, the mixing was stopped, and the separation of the two liquid phases was waited for, which did not take longer than 20 sec. Samples of 10 ml each were quickly taken from the alkaline aqueous layer, and titrated with 0.1 N sulfuric acid. Phenolphthalein was used as indicator. Preliminary tests had shown that under these conditions the analytical error did not exceed 0.1-0.2%. Hydrolysis of adipic and sebacic acid chlorides was studied by the above-described method at  $20^\circ$ ,  $30^\circ$ , and  $50^\circ\text{C}$ . Three tables and a figure lead to the following conclusions: 1) Hydrolysis of sebacic acid chloride is much slower than saponification of adipic acid chloride. While complete hydrolysis of adipic acid chloride at  $30^\circ\text{C}$  takes 60 min, sebacic acid chloride hydrolyzes only at 26-28% in the same time. The lower saponification rate is probably due to the lower water solubility of sebacic acid chloride. 2) A temperature increase accelerates hydrolysis of the two acid chlorides. 3) The hydrolysis rate of the acid chlorides depends, to a certain extent, on the

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Study of Alkaline Hydrolysis of Adipic and  
Sebacic Acid Chlorides

S/183/60/000/005/002/007  
B005/B054

solvent used. The hydrolysis rate of adipic acid chloride in chloro benzene is higher than in benzene, probably due to different distribution coefficients of adipic acid chloride between the aqueous and the organic phase. The authors determined the effective activation energy of hydrolysis of the two acid chlorides in the multiphase system by determining the maximum reaction rates obtained by differentiation of the curves in a diagram showing the amount of hydrolyzed substance as a function of time (Table 4, Fig. 2). The activation energies of hydrolysis of the two acid chlorides are almost equal. They are 11500 cal/mole (adipic acid chloride) and 10580 cal/mole (sebacic acid chloride). The results obtained confirm the assumption that the difference in saponification rate of the two dicarboxylic acid chlorides investigated is mainly due to the difference in distribution coefficients and, thus, in solubilities. The present paper is the first report on interfacial polycondensation. There are 2 figures, 4 tables, and 9 non-Soviet references.

ASSOCIATION: VNIIV (All-Union Scientific Research Institute of Synthetic Fibers)

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S/183/60/000/005/003/007  
B028/B054

AUTHORS:

Kudryavtsev, G. I., Katorzhnov, N. D., Voitelev, Yu. A.,  
Golubeva, Ye. V., Nenarokomov, L. S.

TITLE:

Effect of Inorganic Salts on the Heat Resistance of Caprone  
Fibers

PERIODICAL:

Khimicheskiye volokna, 1960, No. 5, pp. 16-20

TEXT: The present paper describes investigations carried out to increase the heat resistance of caprone fibers by additions of inorganic salts. The authors used water-soluble copper salts of nitric, citric, lactic, sulfuric, perchloric, acetic, and formic acids. 0.05 - 0.01% additions of these compounds were introduced during the polymerization of caprolactam. The authors further used 0.05-0.01% additions of water-insoluble, fatty-acid copper salts introduced into molten caprolactam. 0.25-0.5% additions of copper borate, copper phosphate, and copper chromate, as well as three-component additions, namely, copper acetate, potassium iodide, and monosubstituted sodium phosphate, were also used. It was shown that the specific viscosity reaches a maximum when adding copper stabilizers and heating the fiber to

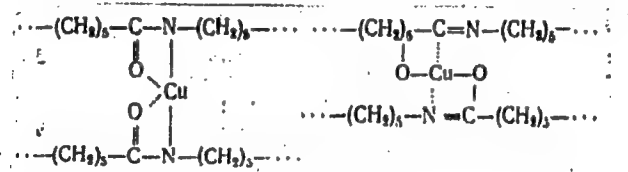
Card 1/4

87875

# Effect of Inorganic Salts on the Heat Resistance of Caprone Fibers

S/183/60/000/005/003/007  
B028/B054

180°C. Fibers with additions of water-soluble copper salts and three-component additions were tested for heat resistance. They were heated for 6, 24, 48, 72, and 100 hours to 150°C, and for 2, 8, 14, 24, and 36 hours to 180°C. It was shown that a simultaneous introduction of multi-component additions during fiber polymerization yielded maximum heat resistance. 0.03% copper acetate, 0.25% sodium phosphate, and 2% potassium iodide were used. This inhibited the decomposition of the fiber during heating. Resistance to tearing increased by 8% on 14 hours' heating to 180°C. After 90 hours' heating to 180°C, it had only dropped by 39.2% (as against 67% after two hours without addition). Copper salts form a chelate compound with the fiber, in which the copper is bound by secondary valencies:



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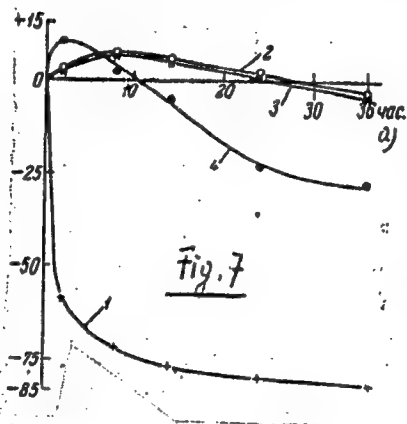
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Effect of Inorganic Salts on the Heat  
Resistance of Caprone Fibers

S/183/60/000/005/003/007  
B028/B054

Chelatization occurs in the lactim rather than in the lactam form.  
There are 11 figures and 13 references: 3 Soviet, 8 German, 1 US,  
2 French, and 1 British.

ASSOCIATION: VNIIV (All-Union Scientific Research Institute of Synthetic  
Fibers)



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B028/B054

Legend to Fig. 7: Change in resistance to tearing of caprone fiber after addition of three-component salts on heating to 180°C in air.  
Curve 1: fiber without addition; 2: with addition of 0.03% Cu acetate, 2% KI, and 0.25%  $\text{NaH}_2\text{PO}_4$ ; 3: with addition of 0.015% Cu acetate, 1% KI, and 0.25%  $\text{NaH}_2\text{PO}_4$ ; 4: with addition of 0.05% Cu acetate; a) hours

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87478

S/183/60/000/006/003/005  
B020/B058

AUTHORS: Zharkova, M. A., Kudryavtsev, G. I., Klimenkov, V. S.  
TITLE: Study of the Conditions of Copolymer Production From Acrylonitrile With Alpha Vinyl Pyridine, Suitable for Fibration  
PERIODICAL: Khimicheskiye volokna, 1960, No. 6, pp. 15-19

TEXT: The paper reports on the results of studies concerning: a) copolymerization of acrylonitrile (AN) with  $\alpha$ -vinyl pyridine ( $\alpha$ -VP) for the purpose of producing a copolymer with predetermined molecular weight and the determination of the optimum concentration of the spinning solution, b) the determination of the optimum concentration of the salt solution, c) the conditions for the production of suitable spinning solutions, and d) the trial formation in precipitating baths with aqueous salt solutions and the study of the physical and mechanical properties of the fiber obtained. In copolymerization, the molecular weight of the copolymer is influenced by the amount of the initiator (azo-diisobutyric acid-dinitrile), the temperature, type of solvent and amount of the regulator (monoethanol amine). Copolymers with a ratio AN :  $\alpha$ -VP of 85 : 15 and 90 : 10 weight%  
Card 1/3

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Study of the Conditions of Copolymer Production S/183/60/000/006/003/005  
From Acrylonitrile With Alpha Vinyl Pyridine, B020/B058  
Suitable for Fibration

were studied. The influence of the amount of regulator on the change in time of the intrinsic viscosity (Fig. 1), and the dependence of the intrinsic viscosity on the regulator concentration (Fig. 2) are determined. The change of the intrinsic viscosity of the solution in dependence on the amount of initiator used is mentioned in Figs. 3 and 4. It can be seen from Fig. 5 that with rising temperature, the intrinsic viscosity of the copolymer produced drops from 2.5 at 60°C to 1.3 at 75°C. The dependence of the intrinsic viscosity of the copolymer on the initial concentration of the monomer mixture (Fig. 6) shows that the probability of a chain rupture through the solvent increases with sinking concentration of the monomers in the solution. As may be seen from the tabulated data concerning the conditions of the copolymerization of AN with  $\alpha$ -VP in the production of spinning solutions, the rate of polymerization in 45 to 50% sodium thiocyanate, under otherwise equal conditions, is always the same and the copolymers have the same intrinsic viscosity (1.39 to 1.4). Fig. 7 shows the dependence of the viscosity of a concentrated sodium thiocyanate solution on the intrinsic viscosity of the copolymer. It can be seen from Fig. 8 that at an intrinsic viscosity of 1.38, 10.5% to 11.2%

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Study of the Conditions of Copolymer Production S/183/60/000/006/003/005  
From Acrylonitrile With Alpha Vinyl Pyridine, B020/B058  
Suitable for Fibration

solutions are suitable for the shaping of the fiber, and at an intrinsic viscosity of 0.97, 15% solutions. The fiber produced under the optimum conditions determined had the following values; metric number 3970, breaking length 25.6 km, elongation 32%; the fiber can be dyed well with acid, acetate and alkaline dyes. There are 8 figures, 1 table, and 4 references: 2 Soviet and 2 US.

ASSOCIATION: VNIIV (All-Union Scientific Research Institute of Synthetic Fibers) X

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S/190/61/003/009/004/016  
B110/B101

AUTHORS: Bogdanov, M. N., Kudryavtsev, G. I., Mandrosova, F. M.,  
Spirina, I. A., Oströmogol'skiy, D. Ye.

TITLE: Synthesis of some polyamides on the basis of  $\alpha,\omega$ -amino-  
carboxylic acids with benzene or cyclohexane rings in  
methylene chains

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 9, 1961,  
1326-1331

TEXT: Polyamides from  $\alpha,\omega$ -aminocarboxylic acids with aromatic rings in  
the chain (p-aminomethyl-phenyl-alkane carboxylic (p-AMPA) and p-amino-  
ethyl-phenyl-alkane carboxylic acids) are important for the production of  
thermostable fibers (400-500°C). The spinnability of polyamides (PA) and  
copolyamides (with  $\epsilon$ -caprolactam ( $\epsilon$ -CL)) based on p-aminomethylbenzoic  
acid (p-AMBA) and m-aminomethylbenzoic acid (m-AMBA) was tested. The  
following compounds were synthesized: 4-aminomethyl-cyclohexyl carboxylic  
acid (4-AMCA); 3-aminomethyl-cyclohexyl carboxylic acid (3-AMCA); 4-amino-  
ethyl-cyclohexyl propionic acid (4-AECA); cis-4-aminocyclohexyl butyric acid  
Card 1/5

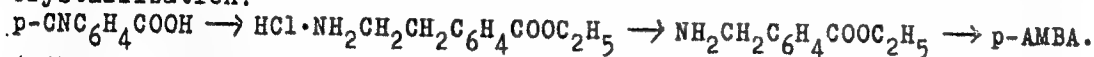


27569

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B110/B101

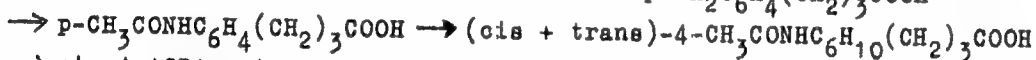
Synthesis of some polyamides ...

(cis-4-ACBA); trans-4-aminocyclohexyl butyric acid (trans-4-ACBA); and their polyamides. Pure p- and m-AMBA were prepared from the corresponding cyanobenzoic acids via the ethyl ester which can easily be purified by crystallization:



4-AMCA, 3-AMCA, and 4-AECA were obtained by hydrogenation of the corresponding aromatic acids. Instead of Pt catalyst, rhodium black on  $\text{Al}_2\text{O}_3$  which is more effective for the hydrogenation of aromatic was used

according to A. A. Balandin, M. L. Khidekel' (Ref. 12: Dokl. AN SSSR, 123, 84, 1958). Cis- and trans-4-ACBA which were separated by means of hot acetone were synthesized as follows:  $p\text{-NH}_2\text{C}_6\text{H}_4(\text{CH}_2)_3\text{COOH}$



$\rightarrow$  cis-4-ACBA + trans-4-ACBA. The following substances were synthesized for the first time: 4-AECA; cis- and trans-4-ACBA; the lactam of 3-AMCA; the hydrochlorides of the ethyl esters of p- and m-AMBA; cis- and trans-N-acetyl-4-ACBA and N-acetyl-p-aminophenyl butyric acid. The polymers of p- and m-AMBA are only slightly viscous, do not form fibers, and melt under decomposition above  $300^\circ\text{C}$ , as their "aromatic" carboxyl groups

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Synthesis of some polyamides ...

undergo side reactions. p-AMPA and 4-AMCA in which benzene ring and COOH groups are separated by  $-CH_2-$  groups form polymers with higher molecular weight. The copolymers of p-AMBA with  $\epsilon$ -CL, on the other hand, form strong fibers from the melt which can be cold-drawn. The p-AMBA carboxyl groups are assumed to form more heat-resistant amide groups with the amino groups of the  $\epsilon$ -aminocaproic acid radicals. The copolycondensation products of m-AMBA with  $\epsilon$ -CL and  $\omega$ -aminoenanthic acid are little more viscous than m-AMBA homopolymers. Polycondensation is rendered difficult because of the instability of the carboxyl groups, and because of chain cleavage owing to cyclization of the end group as a result of a favorable mutual position of the amino groups and CO groups of the amide bonds. The high-molecular PA of 4-AMCA and trans-4-ACBA cannot be spun from the melt owing to decomposition. The PA of cis-4-ACBA was not pure, bubbly, colored and low-viscous. The high-molecular PA of 4-AECA which is stable even at  $340^\circ\text{C}$  forms strong fibers from the melt which can be cold-drawn. 3-AMCA forms, when heated, a non-polymerizable lactam. p-cyanobenzoic acid dissolved in 15%  $\text{NH}_3$  was hydrogenated at room temperature and 15 atm pressure of  $\text{H}_2$ . The reaction product was dried, suspended in ethanol, and the Card 3/5

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S/190/61/003/009/004/016  
2110/B101

Synthesis of some polyamides ...

suspension was saturated with HCl. The hydrochloride of the ethyl ester of p-AMBA (melting point = 237-238°C) was obtained, which yielded p-AMBA after treatment with 28% NH<sub>3</sub>. The hydrochloride of the ethyl ester of m-AMBA (melting point = 151-152.5°C) resulted from the hydrochloride of m-AMBA by treating it with ethanol and HCl. In the same way as with the p-compound, m-AMBA was obtained therefrom (melting point = 265-266°C). 4-AMCA was prepared from p-AMBA by means of hydrogenation in a sealed capillary (melting point = 239.5-240°C). The following data are given: 3-AMCA: melting point = 191.5-192.5°C; 4-AECA: melting point = 231-232°C; N-acetyl-p-aminophenyl butyric acid: melting point = 174-175°C; trans-N-acetyl-4-amino-cyclohexyl butyric acid: melting point = 198-199.5°C; cis-N-acetyl-4-amino-cyclohexyl butyric acid: melting point = 113-114°C. Trans-4-ACBA was obtained from the trans-N-acetyl-4-amino-cyclohexyl butyric acid by sulfuric acid hydrolysis at 150-155°C and separation in a column with 3A3-10T (EDE-10P) anionite. Cis-4-AMBA (melting point = 226-228°C) was prepared from cis-N-acetyl-4-AMBA. The lactam (melting point = 152-153°C, well soluble in benzene and H<sub>2</sub>O) was obtained from 3-AMCA by elimination of water. Polycondensation of the amino acids was

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Synthesis of some polyamides ...

carried out in N<sub>2</sub> stream in test tubes. Copolymerization with ε-CL was first performed in a sealed ampul, then in N<sub>2</sub> stream. Fiber formation was examined on a special device according to M. B. Sigal et al. (Ref. 16: Khim. volokna, 1959, no. 5, 29). The authors thank B. V. Suvorov, Head of the laboratories of the Institut khimii AN KazSSR (Institute of Chemistry of the AS Kazakhskaya SSR) for providing p-cyanobenzoic acid. There are 2 tables and 16 references: 7 Soviet and 9 non-Soviet. The three most recent references to English-language publications read as follows: US Patent 2, 868, 769; M. Levine et al., J. Organ. Chem. 24, 115, 1959; US Patent 2, 910, 457.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennog volokna (All-Union Scientific Research Institute of Synthetic Fibers)

SUBMITTED: October 22, 1960

Card 5/5

15 5560

27566  
S/183/61/000/005/002/CO;  
B101/B110

AUTHORS Zharkova, M. A., Rassolova, E. A., Kudryavtsev, G. I.,  
Klimenkov, V. S.

TITLE: Copolymerization of acrylonitrile and 2-methyl-5-vinyl  
pyridine in aqueous sodium thiocyanate solution

PERIODICAL: Khimicheskiye volokna, no. 5, 1961, 13 - 17

TEXT: The authors attempted to improve the quality of acrylonitrile fibers by means of pyridine derivatives. Previous papers (Khim. volokna, no. 3, 15 (1960); ibid., no. 6, 15 (1960)) dealt with the copolymerization of acrylonitrile (AN) and  $\alpha$ -vinyl pyridine ( $\alpha$ -VP). In the present paper, the system AN - 2-methyl-5-vinyl pyridine (MVP) was studied, since a simple method of producing MVP has been developed in the Soviet Union. 50% sodium thiocyanate proved to be an optimum solution for copolymerization. Experiments at room temperature and 70°C showed that the formation of sufficiently concentrated homogeneous spinning solutions (12 - 15%) with a maximum ratio AN:MVP = 85:15 is limited due to the poor solubility of MVP. Copolymerization of AN and MVP is analogous to that of AN and

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Copolymerization of...

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B101/B110

$\alpha$ -VP. The yield after 60 min is 60 - 65%. The reaction rate drops linearly with the time of polymerization. Fig. 4 shows that the pH of the medium exerts a considerable effect upon the yield. These data are not in agreement with those obtained by Yamamoto (see below). Only in acid media does the specific viscosity depend on pH; in alkaline media it is constant. The initiator used in copolymerization was azodiisobutyric acid dinitrile. The polymerization rate was found to be a linear function of the square root of the initiator concentration. With 0.05% initiator (optimum concentration), the polymer yield after 1.5 hr is 75 - 80%. A rise in temperature (from 60 to 80°C) accelerates the process. 70°C is optimum for a 7% monomer solution, since the polymerization rate is not high enough as to cause overheating. The activation energy is 14.5 kcal/mole. To obtain optimum spinning solutions, the specific viscosity should not exceed 1.0 - 1.2. Therefore, experiments were made with various regulators: monoethanol amine, thiourea, thymol, lauryl mercaptan, diperoxide (= dipropyl xanthogenatedisulfide), thiourea dioxide. Monoethanol amine was the only substance to affect the molecular weight of the polymer. 0.7% of monoethanol amine (with  $\alpha$ -VP only 0.2%) was required to obtain AN-MVP copolymers of the desired viscosity. The effect of the ratio

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B101/B110

Copolymerization of...

of components was studied with a 7% monomer concentration, at 70°C, pH = 7, 0.5% initiator, and without a regulator. Results: (1) the copolymerization constants of Ref. 5 (see below) were confirmed; (2) with 5% MVP, yield: 86%, with 30% MVP, only 52%; (3) the specific viscosity dropped from 4.86 to 1.8 as the MVP content increased. There are 11 figures, 2 tables, and 5 references: 2 Soviet and 3 non-Soviet. The three most important references to English-language publications read as follows: British Patent 752135, 22/VI, 1955; USA Patent 2847389, 12/VIII 1958; Ref. 5; Yamamoto, Ind. Chem. Soc., 62, no. 3, 476 (1959). X

ASSOCIATION: VNIIV

Card 3/4

28940

S/063/61/006/004/010/010  
A057/A129

15.8150

AUTHORS: Odnoralova, W. N., Kudryavtsev, G. I.

TITLE: Synthesis of new phosphoroorganic polyesters and polyamides

PERIODICAL: Zhurnal vsesoyuznogo khimicheskogo obshchestva imeni D. I. Mendele-  
yeva, v. 6, no. 4, 1961, 479 - 480

TEXT: Synthesis of phosphoroorganic polyesters and polyamides based on phosphonates and phosphine oxides is described. Methyl-di-(p-carbomethoxyphenyl)-phosphonate was used to synthesize the polyester, and ethyl-di-(p-carboxyphenyl)-phosphine oxide for the polyamide. A method for the preparation of this phosphonate was also developed. This compound was synthesized from methylphosphine acid dichloroanhydride and the methyl ester of p-oxybenzoic acid in presence of triethylamine as condensation agent. This reaction occurs best in two stages, viz., in presence of an amount of reagents sufficient for the formation of the triethylnolamine salt of the ester and subsequent condensation of the salt with dichloroanhydride. Synthesis of the polyester from phosphonate and ethylene glycol was carried out according to V. V. Korshak. [Ref. 1: Metody vysokomolekulyarnoy organicheskoy khimii (Methods of high molecular organic chemistry) v. 1, 1953, p. 527].

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Synthesis of new phosphoroorganic polyesters and...

289403/063/61/006/004/010/010  
A057/A129

but at a maximum temperature of 210°C. A mixture of zinc acetate and lead oxide was used as catalyst. The obtained polyphosphonate was a dark brown solid product with a melting point of 67 - 73°C and a maximum molecular weight of 3,000. Experiments of polycondensations of the phosphonate with ethylene glycol and dimethylterephthalate were carried out and the results are presented in Table 1. Synthesis of the polyamides occurred from the ethylene diamine and hexamethylenediamine salts of the phosphine oxide. The initial ethyl-di-(p-carboxyphenyl)-phosphine oxide was synthesized from phosphorus trichloride and p-magnesiumbromotoluene according to P. W. Morgan and B. C. Herr [Ref. 2: J. Am. Chem. Soc., 74, 4526 (1952)]. The polymer obtained with the ethylene diamine salt did not show fibro-elastic properties, while the product of the hexamethylenediamine salt had enough elasticity for the manufacture of filaments. The properties and preparation conditions were presented in Table 2. All the polymers obtained showed self-extinguishing properties with respect to inflammation. There are 2 tables and 2 references: 1 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION; Vsesoyuzn<sup>nyy</sup> nauchno-issledovatel'skiy institut iskusstvennogo volokna  
(All-Union Scientific Research Institute of Synthetic Fibers)

SUBMITTED: December 9, 1960

Card 2/4

27496

155546 2203 1303, 1436

S/062/61/000/009/012/014  
B117/B101

AUTHORS: Freydlin, L. Kh., Sladkova, T. A., Kudryavtsev, G. I.,  
Sheyn, T. I., Zil'berman, Ye. N., and Fedorova, R. G.

TITLE: Catalytic hydrogenation of aromatic nitriles and the  
properties of polyamides obtained from p-( $\beta, \beta'$ -diamino-diethyl)  
benzene

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh  
nauk, no. 9, 1961, 1713-1715

TEXT: The hydrogenation of p-phenylene diacetondinitrile to give p-( $\beta, \beta'$ -  
diamino-ethyl) benzene:

$\text{NC-CH}_2\text{-C}_6\text{H}_4\text{CH}_2\text{CN} \rightarrow \text{H}_2\text{N-C}_2\text{H}_4\text{-C}_6\text{H}_4\text{-C}_2\text{H}_4\text{-NH}_2$  and the properties of the  
polyamides based on this diamine were studied. The p-phenylene diacetodi-  
nitrile (m.p.  $95^\circ\text{-}97^\circ\text{C}$ ) was prepared from acetone cyanohydride and  
p-xylylene dibromide. Hydrogenation was carried out at  $100^\circ\text{-}105^\circ\text{C}$  and an  
initial hydrogen pressure of 100 atm in a rotating autoclave of 0.175 liter  
capacity. Dioxane, methyl alcohol, or ethyl alcohol containing some  
ammonia were used as mediums. The catalysts were prepared by exhaustively  
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Catalytic hydrogenation of ...

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S/062/61/000/009/012/014  
B117/B101

leaching powdered 50% nickel-aluminum- and cobalt-aluminum alloys with 10% aqueous NaOH solution. The catalysts were then washed with water up to neutral reaction against phenolphthalein. Cobalt skeleton catalyst leached with 25-30% aqueous alkali solution at maximally 15°C (Ref. 5: see below) was used in some experiments. Diamine yields are strongly influenced by the nature of the catalyst and its preparation method. The yield is 64-65% in the case of nickel skeleton catalyst, 74% with cobalt skeleton catalyst leached at 90°-100°C, and 94% with catalyst prepared by "cold leaching". The authors also studied the polycondensation of p-(β,β'-diamino-diethyl) benzene with adipic acid and terephthalic acid. Addition of acetone to an equimolar mixture of aqueous diamine- and adipic acid solutions precipitates the salt. This salt is crystallized twice from water, yielding a white crystalline substance, m.p. 200°-202°C (C<sub>16</sub>H<sub>26</sub>N<sub>2</sub>O<sub>4</sub>). The polyamide was obtained by polycondensation of this salt at 260°-280°C. Polycondensation occurs in the solid phase below the melting point of the polyamide. This polyamide based on p-(β,β'-diamino-diethyl) benzene and adipic acid was also prepared at 20°C by heterophase polycondensation: reaction between the aqueous diamine solution (with sodium carbonate added) and adipic chloride in benzene. Polyamides were

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B117/B101

Catalytic hydrogenation of ...

also prepared in an analogous manner by reaction of terephthalic- and sebacic chlorides in methylene chloride with aqueous diamine solutions containing alkali to bind the hydrochloric acid formed, according to the method by P. W. Morgan (Ref. 8, see below). In all experiments, polycondensation of adipic acid with the diamine under investigation yielded a polyamide having a melting point of  $314^{\circ}$ - $320^{\circ}$ C. It is soluble in concentrated  $H_2SO_4$ , cresol, formic acid, hydrochloric acid, and insoluble in organic solvents. Polyamides of higher mol wt. are obtained by increasing the reaction temperature and reaction time. The relative viscosity of these polyamides in concentrated  $H_2SO_4$  is increased from 1.73 to 2.69. By spinning these high-molecular polyamides from their melts at  $335^{\circ}$ - $340^{\circ}$ C fibers capable of orientation at high temperatures were obtained. The polymer properties are also affected by the purity of the amino salt used. If the salt is only recrystallized once, colored polyamides of lower molecular weight are formed. There are 2 tables and 8 references: 3 Soviet and 5 non-Soviet. The four most recent references to English-language publications read as follows: F. G. Lum, E. F. Carlston, Industr. and Engng Chem. 44, 1595 (1952); E. F. Carlston, F. G. Lum,

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Catalytic hydrogenation of ...

27496  
S/062/61/000/009/012/014  
B117/B101

Industr. and Engng Chem. 49, 1239 (1957); Ref. 5: B. V. Aller, J. Appl. Chem. 7, 130 (1957); Ref. 8: P. W. Morgan, SPE-Journal 15, 485 (1959).

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR); Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna (All-Union Scientific Research Institute of Synthetic Fibers)

SUBMITTED: March 28, 1961

Card 4/4

MANDROSOVA, F.M.; KULRYAVTSEV, G.I.

Reaction of acrylonitrile with biphenyl. Zhur.ob.khim. 31 no.7:  
2246-2248 J1 '61. (MIRA 14:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo  
volokna.

(Acrylonitrile) (Biphenyl)

40380

S/190/62/004/009/002/014  
B101/B144

11.2219

AUTHORS: Odnoralova, V. N., Kudryavtsev, G. I.

TITLE: Investigation into the production of polymeric chelate compounds from dithioamides and some metal ions

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 9, 1962, 1314-1319

TEXT: The reaction of dithio oxamide (I), malonic dithioamide (II), adipic dithioamide (III), pimelic dithioamide (IV), and terephthalic dithioamide (V) with  $\text{Cu}^{2+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Co}^{2+}$ , or  $\text{Ni}^{2+}$  in dimethylformamide methanol solution was studied at the ratio dithioamide: metal = 1 : 1.05, pH = 7.0 or 10.0. Results: (1) III, IV, and V react with  $\text{Cu}^{2+}$  at room temperature, but with the other ions at higher temperatures they form metal sulfides. IV was the only substance to form a complex with  $\text{Ni}^{2+}$  which probably contained sulfur and oxygen bridges. (2) Chelate complexes were obtained only with I and II. They are insoluble, noncombustible powders, dissolving only in concentrated  $\text{H}_2\text{SO}_4$  by which (excepting the

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Investigation into the production...

S/190/62/004/009/002/014  
B101/B144

copper chelate of I) they are decomposed. (3) When boiled in water, the chelates (except copper and nickel chelates of I) are hydrolyzed. Conclusions: Chelate compounds are obtained only when 5 or 6-membered cycles are able to form. Chelates with more than 6 members in their cycles are unstable and decompose into metal sulfides. There are 4 tables. The most important English-language reference is: W. Deskin, J. Amer. Chem. Soc., 80, 5680, 1958.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna (All-Union Scientific Research Institute of Synthetic Fibers)

SUBMITTED: May 18, 1961

Card 2/2



KONKIN, A.A., doktor tekhn.nauk; KUDRYAVTSEV, G.I., kand.tekhn.nauk

Lateat developments in the field of synthetic fibers. Zhur.VKHO  
7 no.2:180-186 '62. (MIRA 15:4)  
(Textile fibers, Synthetic)

KUDREAVTEV, G. I. [Kudryavtsev, G. I.]; KONKIN, A. A.

New fiber-forming polymers. Anal. ch. 17 no.1:109-133  
Ja-Mr '62.

S/183/63/000/001/001/004  
B101/B186

AUTHORS: Sheyn, T. I., Katorzhnov, N. D., Kudryavtsev, G. I.

TITLE: Fractional composition of polyamides synthesized at an interface under static conditions

PERIODICAL: Khimicheskiye volokna, no. 1, 1963, 17-19

TEXT: A film formed at the interface of sebacyl dichloride dissolved in chloro benzene and hexamethylene diamine dissolved in water containing  $\text{NaHCO}_3$ . This was drawn out without mixing the solutions, and its

fractional composition was tested. Polymers with a degree of polymerization (DP) between 87 and 143 were obtained by changing the concentration of the sebacyl dichloride from 8 to 10% by weight, and that of the hexamethylene diamine from 1 to 5% by weight. Comparison with the fractional composition of polycaprolactam polymerized in the melt showed that the DP covers a wider range on interfacial polymerization than on melt polymerization, but the fractions with a DP of 50-200 predominate in both polymers. The interfacially polymerized polymer is characterized by fractions with DP up to 600, but the content of highly polymerized

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Fractional composition of polyamides... S/183/63/000/001/001/004  
B101/B186

fraction (DP>200) is only 18-19%. The maximum on the differential curve lies at lower DP for the interfacial polymer than for polycaprolactam. Similar results were obtained by comparing the interfacial polymer with polyhexamethylene adipic amide produced by thermal polymerization of AH salt.. Polyhexamethylene adipic amide had an average DP of 184 with a maximum at DP=105, while the respective values for the interfacial polymer were 143 and 75. Conclusion: Interfacial polymerization at first proceeds irreversibly at a rate corresponding to the range of ionic reactions, so that no secondary reactions occur. After formation of a monomolecular layer, the rate of polymerization depends on monomer diffusion through the layer. Due to the changes in concentration, the rate of diffusion finally becomes commensurate with the rate of termination. The polymer chains formed in the last stage therefore differ from those formed initially. There are 2 figures.

ASSOCIATION: VNIIV

SUBMITTED: March 4, 1962

Card 2/2

S/183/63/000/002/001/003  
A051/A126

AUTHORS: Zharkova, M.A., Rassolova, E.A., Kudryavtsev, G.I., Klimenkov, V.S.

TITLE: Production of fibers based on acrylonitrile (AN) and 2-methyl-5-vinylpyridine (MVP) copolymer

PERIODICAL: Khimicheskiye volokna, no. 2, 1963, 8 - 12

TEXT: This is the fourth article in a series of reports on the production of fibers based on AN copolymer in aqueous solutions of sodium thiocyanate. Studies were conducted on the properties of concentrated solutions of AN and MVP copolymer, in a 5% aqueous solution of sodium thiocyanate, based on previous data obtained by the authors to find the main law sequence of the copolymerization process. Conditions of the fiber formation of a given composition were investigated. The results of the experiments are submitted. The investigation of the copolymerization process of the AN and MVP system revealed certain differences to that of the acrylonitrile- $\alpha$ -vinylpyridine system (AN- $\alpha$ -VP). The AN and MVP copolymer has certain technological advantages. The reduced viscosities of these copolymer solutions make it possible to use more concentrated solutions

Card 1/2

Production of fibers based on acrylonitrile ....

S/183/63/000/002/001/003  
A051/A126

or polymers of a higher molecular weight. The AN-MVP system allows for a wider range of the polymer concentration change than the AN- $\alpha$ -VP system. The fibrous solution shows a tendency to structuralizing, especially when using copolymers with a specific viscosity above 2. Experiments showed the optimum specific viscosity to be 1.25 - 1.5. A slight temperature elevation of the solution reduces the latter. Investigated solutions of 0.8, 1.25, 1.48 initial specific viscosity, left to stand, did not gelatinize at 25°C, 70°C, even when left for 1,000 h. The homogeneity of the fibrous solutions, after the end of the dehydration process, remained constant. There are 5 figures and 1 table.

ASSOCIATION: VNIIV

SUBMITTED: June 12, 1962

Card 2/2

44272

S/190/63/005/001/020/020  
B117/B186

5.3833

AUTHORS: Kudryavtsev, G. I., Vasil'yeva-Sokolova, Ye. A., Mazel', I.S.

TITLE: Synthesis of polymers based on 2,6-lutidine and aromatic dialdehydes

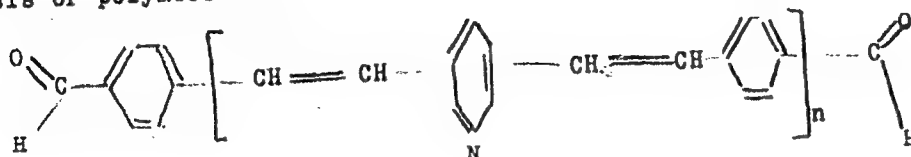
PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 5, no. 1, 1963, 151-152

TEXT: A new method of synthesizing thermostable polymers is the polycondensation of lutidine and N-methyl lutidine iodide with aromatic dialdehydes. An infusible, light-brown powder soluble in acids and in some organic solvents (quinoline, cresol, benzyl alcohol) was produced from equimolecular amounts of lutidine and terephthalaldehyde by heating (160-220°C) in the presence of  $ZnCl_2$ . The specific viscosity of a 0.5% solution of the polymer in sulfuric acid is 0.103. The molecular weight determined according to Rast is 1800-2300. The following structure was found for the polymer from infrared spectra and elementary analyses:

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Synthesis of polymers based on ...

S/190/63/005/001/020/020  
B117/B186



Its heat resistance is seen from the following data: Heating of the sample at 300°C (5 hrs) in air leads to a loss in weight of 7.25%; at 400°C (3 hrs) the loss in weight is 14.70%; heating at 400°C (3 hrs) in nitrogen leads to a loss in weight of 7.28%. Infusible, dark-brown

powders were produced by heating (70-90°C in absolute alcohol) of N-methyl lutidine iodide with aromatic dialdehydes (terephthal isophthalaldehyde, bis-4-formyl phenyl ester) in the presence of piperidine. Although the powders were insoluble in most of the solvents, they yielded weakly concentrated solutions with certain compounds which reacted with aldehyde groups of the polymer. The resulting polymers showed semiconductor properties: the electrical conductivity of a non-preheated sample (obtained from N-methyl lutidine iodide and terephthalaldehyde) was

Card 2/3



Synthesis of polymers based on ...

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B117/B186

$0.3 \cdot 10^{-9} \text{ ohm}^{-1} \cdot \text{cm}^{-1}$  at room temperature. The investigation of the properties and the synthesis of polymers of the new type is being continued.  
[Abstracter's note: Essentially complete translation.]

SUBMITTED: August 14, 1962

Card 3/3

h5397  
S/190/63/005/002/008/024  
B101/B102

15.8080

AUTHORS:

Volokhina, A. V., Kudryavtsev, G. I., Mikhaylov, N. V.,  
Rokachevskaya, O. P.

TITLE:

Study of ring copolymerization. I. Copolymerization of  
 $\alpha$ -piperidone with  $\epsilon$ -caprolactam

PERIODICAL:

Vysokomolekulyarnyye soyedineniya, v. 5, no. 2, 1963,  
206-211

TEXT: The possibility was studied of obtaining high-molecular fiber-forming polyamides on the basis of  $\alpha$ -piperidone by copolymerizing it with  $\epsilon$ -caprolactam (CL). Two techniques were applied: (1) Copolymerization at 40-45°C, 1-2 mm Hg, CL content 0-80%, and at 90°C with 90 and 100% CL; (2) in nitrogen atmosphere at 100, 120, and 160°C. The catalysts used were 2.5 mole% potassium and 1.2 mole% N-acetyl piperidone. Results with process (1): At 40-45°C, the polymerization time was 6 hrs, at 18-20°C 18 hrs, the yields (~60%) and m.p. of the copolymers depended on the composition and were always higher than in the homopolymers. Mutual activation of piperidone and CL was observed. With equimolecular component

Card 1/3

S/190/63/005/002/008/024  
B101/B102

## Study of ring copolymerization. ...

ratio the m.p. decreased to  $\sim 0^{\circ}\text{C}$ , so that copolymerization ensued at room temperature. The maximum yield was obtained with 40% piperidone and 60% CL. With equimolecular component, ratio the copolymer contained equally equimolecular parts of the components. Results in process (2): The yield increased with rising CL content.  $\alpha$ -piperidone in itself and its 80-90% mixture with CL could not be polymerized under these conditions. The m.p. of the copolymer increased with increasing CL content. The optimum yield, 97%, was obtained with 30% piperidone + 70% CL. The polymerization time was 4 hrs at  $100^{\circ}\text{C}$ , 2 hrs at  $120^{\circ}\text{C}$ , 1 hr at  $160^{\circ}\text{C}$ . The melting point increases with rising polymerization temperature and reaches  $180-185^{\circ}\text{C}$ . The molecular weight is not affected by varying the addition of potassium between 1 and 2.5 mole%, but it is reduced when the addition of N-acetyl piperidone is increased from 0.25 to 1 mole%. At  $\sim 195^{\circ}\text{C}$ , a fiber was drawn from the copolymer melt having an intrinsic viscosity of 0.6, which had 400-500% elongation at room temperature. The increase in reactivity of the  $\alpha$ -piperidone in the presence of CL is due to thermodynamic and kinetic particularities of the process, which must be further investigated. There are 4 figures and 1 table. The most important. English-language reference is: N. Joda, A. Mijake, J. Polymer Sci., 43, 117, 1960.

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Study of ring copolymerization. ...

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